

## **REMARKS**

Upon entry of the present amendment, claims 1-2, 4-5, 7-14, and 18-23 will be pending in the application.

Claims 1-2, 4-5, 7-14, and 18-19 been amended, claim 3 has been canceled, and claims 20-23 have been added in accordance with the requirements of U.S. patent practice.

The term “coating composition” has been replaced by “PVC plastisol” in claims 1-2, 4-5, 7-14, and 18-19. Support can be found at least on p. 3, ll. 20-32.

Claim 12 has been amended to depend from claim 2 rather than claim 1.

Process claim 14 has been amended to reflect the components present in claims 1 and 2, from which it depends. Dependence on canceled claim 3 has been deleted.

The missing verb “comprise” has been added to claim 18.

Amendments to, cancellation of, and additions to, the claims, as set forth above, are made in order to streamline prosecution in this case by limiting examination and argument to certain claimed embodiments that presently are considered to be of immediate commercial significance. Amendment or cancellation of the claims is not in any manner intended to, and should not be construed to, waive Applicants' right in the future to seek such unamended or cancelled subject matter, or similar matter (whether in equivalent, broader, or narrower form) in the present application, and any continuation, divisional, continuation-in-part, RCE, or any other application claiming priority to or through the present application, nor in any manner to indicate an intention, expressed or implied, to surrender any equivalent to the claims as pending after such amendments or cancellations.

Applicants thank the PTO for the apparent removal of the 35 U.S.C. 102(b) rejections of claims 1-14 and 18 as being anticipated by Colyer *et al.* and Hensler *et al.* Reconsideration of the remaining rejections is respectfully requested in view of the foregoing amendments and following remarks.

1. **Rejection of claims 1-5, 7-14 and 18 under 35 U.S.C. 112, first paragraph, as not enabling any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with the claims.**

In particular, the PTO alleges, “the specification, while enabling for PVC plastisols, does not reasonably provide enablement for any other coating composition” (p. 2, Section 3, first

par.). Applicants respectfully disagree. The coating composition of independent claim 1, and the claims which depend therefrom, are drawn to a coating composition comprising elements (A), (B), (C), (D), (E), and (F) which is described as a PVC plastisol at least on p. 3, ll. 20-32, p. 7, ll. 3-4, p. 8, ll. 29-34, and p. 10, ll. 8-17. Applicants submit that it is clear from claim 1 and from the specification as filed that no other coating composition besides a PVC plastisol is meant. Applicants also submit that it is well within the capability of any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the PVC plastiols of the invention commensurate in scope with the claims by reading the specification. Nevertheless, in order to advance prosecution of this case, the claims have been amended to replace “coating composition” with “PVC plastisol”. Reconsideration and removal of the enablement rejection is respectfully requested.

**2. Rejection of claims 1-5, 7-14 and 18 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.**

In particular, the PTO alleges, “[t]here is no mention of ‘coating composition’-s in the instant specification. Applicants respectfully disagree. Although there is no use of the term “coating composition” in the specification, there is broad usage of the closely related term “coating”, at least on p. 1, ll. 7-8, 11-14, 17-18, 25-28, p. 2, l. 19, and many other locations throughout the specification. By definition, coatings are produced from coating compositions. Any person skilled in the art will readily recognize that the PVC plastiols used to produce the coatings of the invention are coating compositions. Nevertheless, in order to advance prosecution of the case, the term “coating composition” has been removed from the claims. Reconsideration and removal of the written description requirement is respectfully requested.

**3. Rejection of claim 1 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

This rejection has been resolved by the present amendment to claim 1. Reconsideration and removal of the distinctness rejection is respectfully requested.

4. **Rejection of claims 1-14 and 18 under 35 U.S.C. 103(a) as being obvious over Coyler et al. (U.S. Patent No. 5,223,322), hereafter "Coyler", Hensler et al. (U.S. Patent No. 5,695,696), hereafter "Hensler", or Marecki (U.S. Patent No. 5,837,347), hereafter "Marecki", in view of Hubert et al. (U.S. Patent No. 6,162,504), hereafter "Hubert", Ko et al. (U.S. Publication No. 2002/0187341), hereafter "Ko", or Regelski, et al. (U.S. Patent Publication No. 2004/0115398), hereafter "Regelski", with Pedersen et al. (U.S. Patent No. 6,228,925), hereafter "Pedersen", as evidence.**

Applicants appreciate the detailed bases of rejection, but must respectfully disagree. The primary references are Coyler, Hensler, and Marecki. Each of these references is silent on the viscosity characteristics of the PVC homopolymer (A) having particle sizes of from 0.04 to 40  $\mu\text{m}$ , of the PVC homopolymer (B) having particle sizes of from 1 to 400  $\mu\text{m}$ , and of the PVC plastisol comprising (A) and (B). Moreover, none of the cited reference teaches (A) and (B) in a weight ratio such that the PVC plastisol exhibits pseudoplasticity, as required by claim 1. The PTO has provided no evidence that the cited references teach or suggest these limitations.

Instead the PTO alleges:

The thixotropy (pseudoplasticity) and dilatancy of an unfilled plastisol will depend not only on the resin but on the kind and amount of plasticizers used. When a small amount of plasticizer is used most plastiols are dilatant. When a large amount of plasticizer is used most plastiols are basically Newtonian. When a polymeric (polyester) plasticizer is used almost all plastiols are dilatant. When a high solvating plasticizer (butyl benzyl phthalate) is used most plastiols start out as thixotropic but they turn dilatant on standing.

*(Office Action of 9/28/09, p. 4, Section 11)*

Applicants respectfully disagree. Thixotropy is not the same as pseudoplasticity as implied by and relied upon by the PTO. The term "pseudoplasticity" is applied to shear-thinning fluids, i.e. a fluid which displays decreasing viscosity with increasing shear rate. A thixotropic fluid, on the other hand, is a fluid which displays decreasing viscosity over time at a constant shear rate (<http://en.wikipedia.org/wiki/Thixotropic>). Accordingly, clarification from the PTO is requested as to whether thixotropy or pseudoplasticity is meant.

Moreover, the PTO has failed to provide a source or sources for the cited statements about the rheological behavior of plastiols, as it would have been available to any skilled person at the time the invention was made. The only reference to the rheological behavior of components (A) or (B), or of the PVC plastisol, in the cited references is in Pederson, which

states that the rheology of the compositions taught therein are Newtonian (col. 12, l. 46), not pseudoplastic, as required by claim 1.

The PTO alleges, “Applicants do not specify the amount of plasticizer and the kind of plasticizer used, making the limitations meaningless” (Office Action of 9/28/09, p. 4, Section 11). Applicants respectfully disagree.

It is accepted U.S. patent practice to limit composition claims with physical property limitations, including rheological limitations. No support for the PTO’s position that an amount is necessary has been provided. In claim 1, the PVC plastisol defined by limitations (A), (B), (C), (D), and (F) is further defined by the limitation that the PVC plastisol is pseudoplastic. The meaning of the rheology limitation will be clear to any skilled person in the art – compositions not meeting this limitation are excluded from the claim. Moreover, the amount of plasticizer is clearly defined in claim 8 as “10 to 60% by weight, based on PVC plastisol”, and the kind of plasticizer is specified in new claim 21 (“phenolic ester”) and claim 22 (“a phenolic ester, an adipic ester, and a butyric ester”).

The PTO alleges:

Furthermore, the burden is shifted the applicants to prove that the references cited by the examiner do not show the rheological characteristics claimed in the instant application. Since the PTO cannot conduct tests, so it is appropriate to shift the burden to applicants to do so.

(*Office Action of 9/28/09, par. spanning pp. 4-5*)

The PTO appears to be saying the claimed pseudoplasticity limitations are inherent in the hypothetical compositions proposed by the PTO by combining elements from the various references. However, by the PTO’s own admission, most plastiols are either Newtonian or dilatant, not pseudoplastic (*Office Action of 9/28/09, p. 4, Section 11*). In view of this, Applicants have discovered PVC plastiols with a surprising rheological property – pseudoplasticity. Moreover, Pederson teaches that PVC plastiols are either Newtonian (col. 12, l. 46) or dilatant. See Formulations F1-F5 in Table 2 (col. 12) for dilatant plastiols. Based on the PTO’s admission, and the teaching of Pederson, previously known PVC plastiols are either Newtonian or dilatant. Applicants submit that any hypothetical PVC plastisol derived from the combination of elements in the cited references is not inherently pseudoplastic. Therefore, the

composition set forth in claim 1 is not taught or suggested by any combination of the cited references.

The PTO alleges:

Additionally, applicants have failed to show whether the dilatancy or pseudoplasticity of the individual resins and the finished plastisol has anything to do at all with the successful practice of the invention.

*(Office Action of 9/28/09, p. 5, first par.)*

Applicants respectfully disagree. Due to its pseudoplasticity, the PVC plastisol of the present invention allows platelet-shaped effect pigments to be oriented predominantly or exclusively parallel to the surface of the coatings, thereby producing improved light/dark flops and color flops in the coil coating (p. 3, ll. 11-18 and p. 17, l. 37 to p. 18, l. 3). The effect of the pseudoplasticity of the inventive PVC plastisols on light/dark flop and color flop is given in the examples set forth on p. 13, l. 25 to p. 19, l. 36. Inventive PVC plastisols and coatings therefrom are given in Examples 1-3 and Coatings 1-3, respectively. Comparative PVC plastisols and coatings therefrom are given in Examples C1-C3 and Coatings C1-C3, respectively.

An enhanced light/dark flop is observed in Coating 1 relative to Comparative Coating C1. The data are given in Table 4. The first four rows of Table 4 gives the L\* values at measurement angles of 15, 25, 45, and 75° for Comparative Coating C1. L\* is a measurement of lightness/darkness, with L\* = 0 representing black and L\* = 100 representing white. The data show that the lightness is a function of the measurement angle, with the smallest angle of 15° giving the lightest color (L\* = 79.4) and the largest angle of 75° giving the darkest color (L\*=37). This dependence of L\* on measurement angle is termed “light/dark flop”. The difference between L\* at 15° and 75° (42.4) can be called the “light/dark flop.”

The next four rows of Table 4 give color differences between Coating 1 and Comparative Coating C1. In particular, the variable dL\* represents the difference in lightness/darkness between the coatings. Positive values of dL\* indicate that Coating 1 is lighter than Comparative Coating C1. Negative values indicate that Coating 1 is darker than Comparative Coatings C1. As can be seen from the data, Coating 1 affords a much larger light/dark flop than Comparative Coating C1. In Comparative Coating 1, the difference in L\* at 15 and 75° is 79.4 - 37 = 42.4 units. In Coating C1, the difference in L\*, as calculated from the dL\* values and the L\* values

for Comparative Coating C1, is  $84.7 - 26 = 58.7$ , a much larger value than observed for Comparative Coating C1.

An enhanced color flop is observed in Coating 3 relative to Comparative Coating 3. The data are given in Table 6. The variable  $a^*$  is a continuous red/green scale. A positive value of  $a^*$  indicates a shade of red and a negative value indicates a shade of green. The variable  $b^*$  is a continuous yellow/blue scale. A positive value of  $b^*$  indicates a shade of yellow and a negative value indicates a shade of blue. Given the values of  $L^*$ ,  $a^*$ , and  $b^*$  for two colors, a parameter  $dE^*$ , which represents the overall difference between the two colors, is calculated from the following formula:

$$dE^* = ((dL^*)^2 + (da^*)^2 + (db^*)^2)^{0.5}$$

where  $dL^*$ ,  $da^*$ , and  $db^*$  are the respective differences in  $L^*$ ,  $a^*$ , and  $b^*$  between the two colors.

As set forth in the first four rows of Table 6, Comparative Coating C3 shows small differences in  $L^*$ ,  $a^*$ , and  $b^*$  at the different measurement angles. As set forth in the last four rows of Table 6, Coating 3 shows large differences in color from Comparative Example C3, especially in  $a^*$  and  $b^*$ , at each measurement angle. These differences in  $L^*$ ,  $a^*$ , and  $b^*$  at different measurement angles, taken together, is termed "color flop". The total color differences at each measurement angle,  $dE^*$ , are given in the 7th column of the last four rows of Table 6. The parameter  $mdE^*$  is the mean color difference over all the measurement angles. Inventive Coating 3 exhibits an enhanced color flop relative to Comparative Coating 3, exhibiting a mean color difference of 26.6 compared to Comparative Coating C3.

Enhanced color flop is also exhibited in Coatings 1 and 2, and enhanced light/dark flop is also exhibited in Coatings 2 and 3. The enhanced light/dark and color flop of the inventive PVC plastisol coatings arises from the choice of PVC homopolymers (A) and (B) and amounts according to the limitations of claim 1.

For all the reasons set forth above, Applicants respectfully submit that independent claims 1 and 14, and claims 2, 4-5, 7-13, and 18, which depend therefrom, are not obvious over the disclosures of the cited references. Accordingly, reconsideration and removal of the obviousness rejections are requested.

**5. New Claims.**

Claims 20-23 have been added to further claim the invention.

Claim 20 requires that “the plasticizer comprises a phenolic ester”, while claim 21 requires that “the plasticizer comprises a phenolic ester, an adipic ester, and a butyric ester”. Antecedent basis is found at least at p. 6, ll. 24-31.

Claim 22 requires that “a coating formed from the PVC plastisol has a difference in L\*, when measured at 15° and at 75°, of an absolute value of at least 41.3; a difference in a\*, when measured at 15° and at 75°, of an absolute value of at least 15; and a difference in b\*, when measured at 15° and at 75°, of an absolute value of at least 5.8.” Antecedent basis is found in the Examples set forth on p. 13, l. 25 to p. 19, l. 36.

Claim 23 is for “a coil coating comprising the PVC plastisol of claim 1”. Antecedent basis is found at least at p. 10, ll. 25-28.

## **CONCLUSION**

Applicants respectfully submit that the Application and pending claims are patentable in view of the foregoing remarks. A Notice of Allowance is respectfully requested. As always, the Examiner is encouraged to contact the Undersigned by telephone if direct conversation would be helpful.

Respectfully Submitted,

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